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(56) Documents Cited
GB 1276801 A EP 0095539 A1 US 5086368 A
US 4426121 A

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(54) Telecommunications apparatus surge protector with isolator for testing

(57) A surge protection apparatus for a telecommunications circuit has an external closure 24, 28 enclosing a surge protector 26 which is connected to exchange wires via contacts 34, and a removable isolator 40 is provided in the form of a piece of insulating material which engages between the contacts 34 and corresponding contacts 30 of the protector for isolating the surge protector 26 during testing of a terminal unit following installation. The terminal unit connects multiple pairs of exchange wires and has multiple surge protectors 26, each in an enclosure 24, 28 and each having an isolator 40. Each isolator 40 may have a U shape with legs projecting through apertures 38 in the closure 24, 28 to engage between the contacts 30 and 34. A base section of the isolator extends outside the closure 24, 28 to form a gripping portion to facilitate removal of the isolator. The isolator 40 may be of a brighter colour than the closure 24, 28, eg. yellow, to aid identification of its presence. The isolators allow the installation to be tested, eg. for short circuits, by means of a test signal which may be of a magnitude which would trigger the surge protectors if they remained in circuit during the testing.

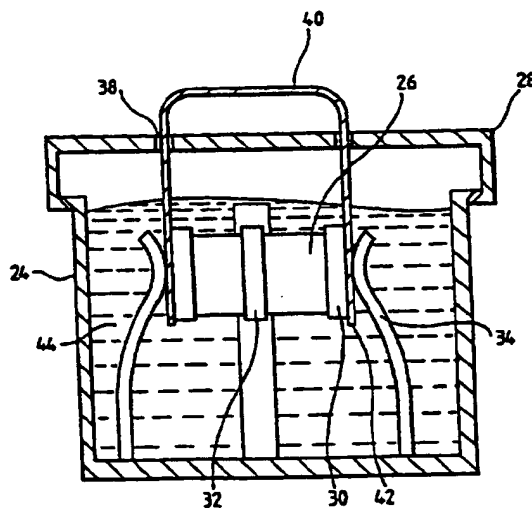


Fig.4.

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1995

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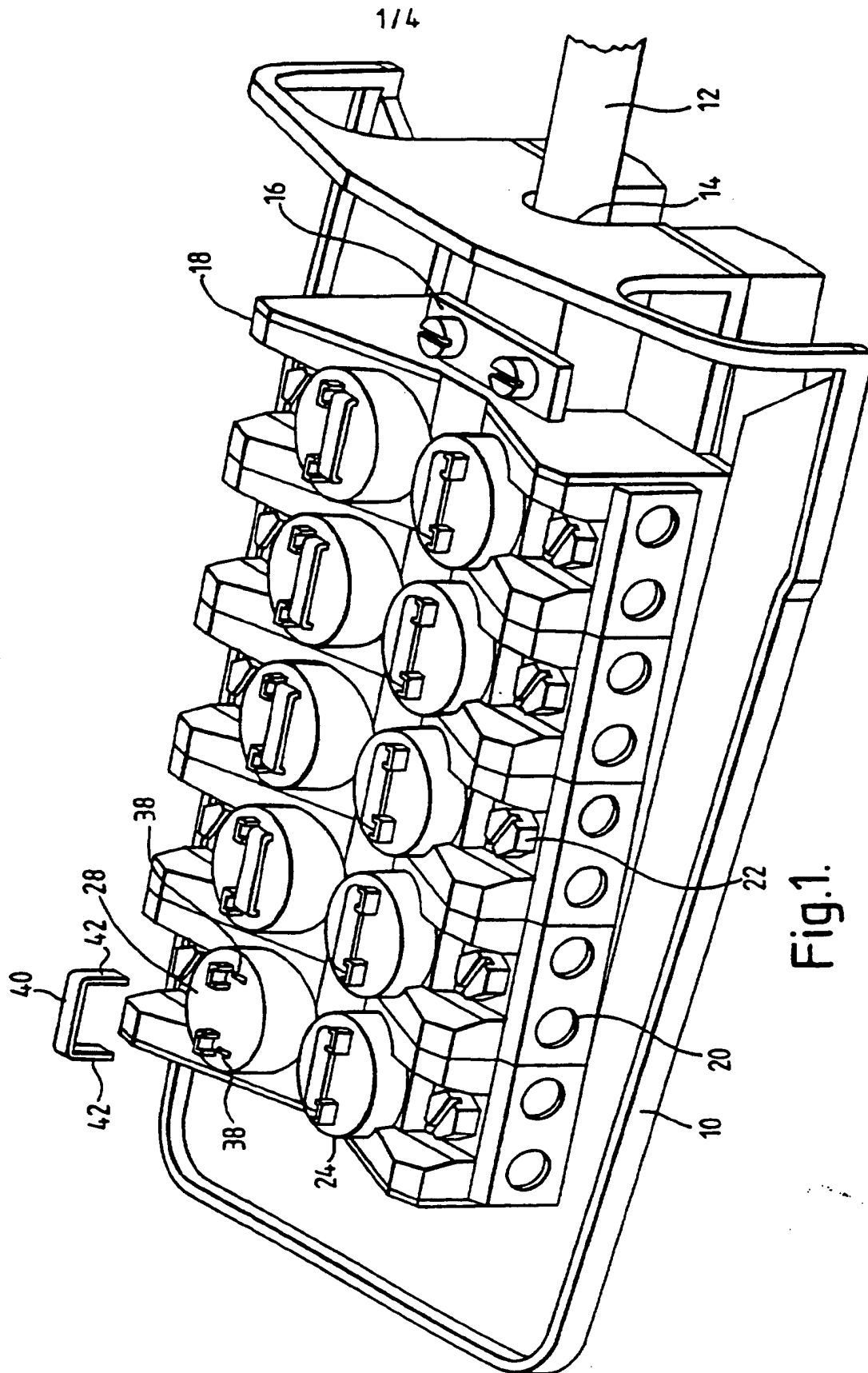


Fig.1.

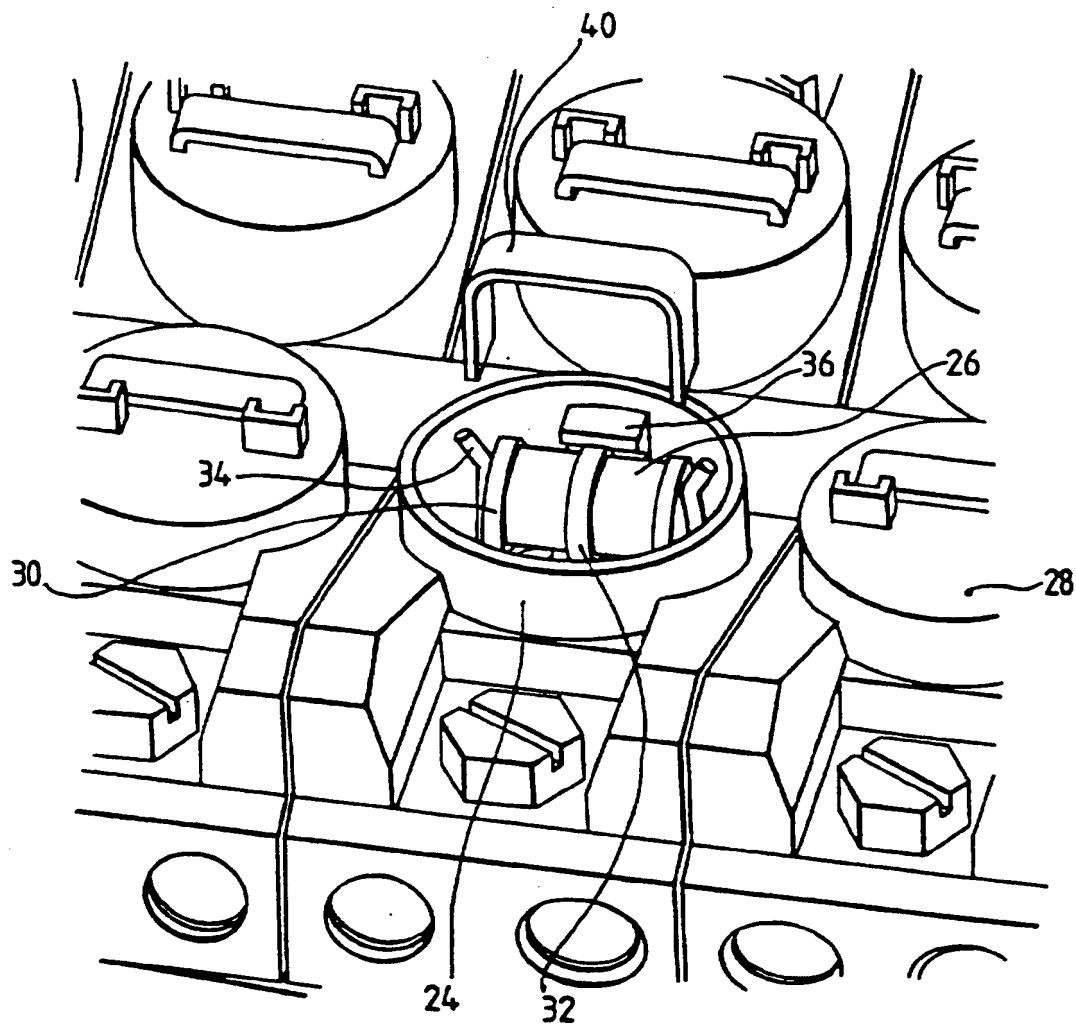


Fig. 2.

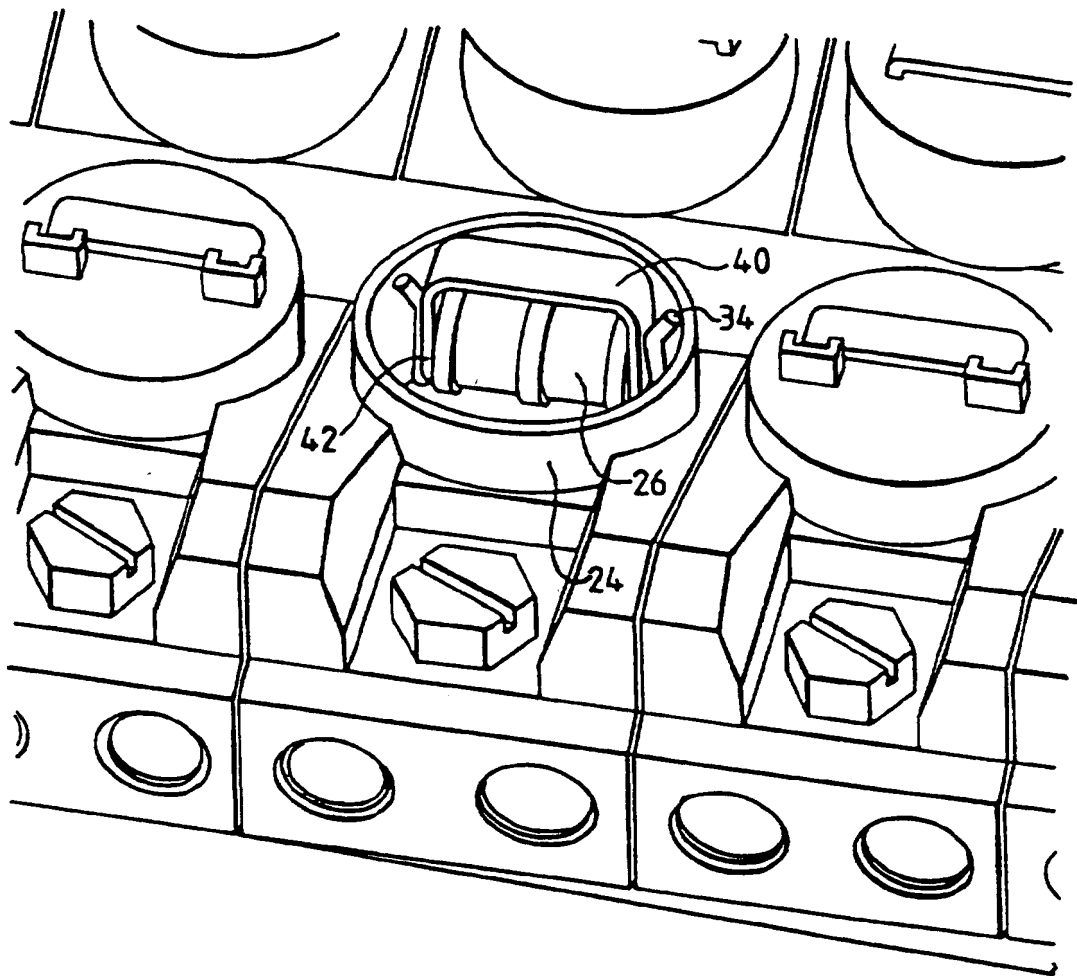


Fig.3.

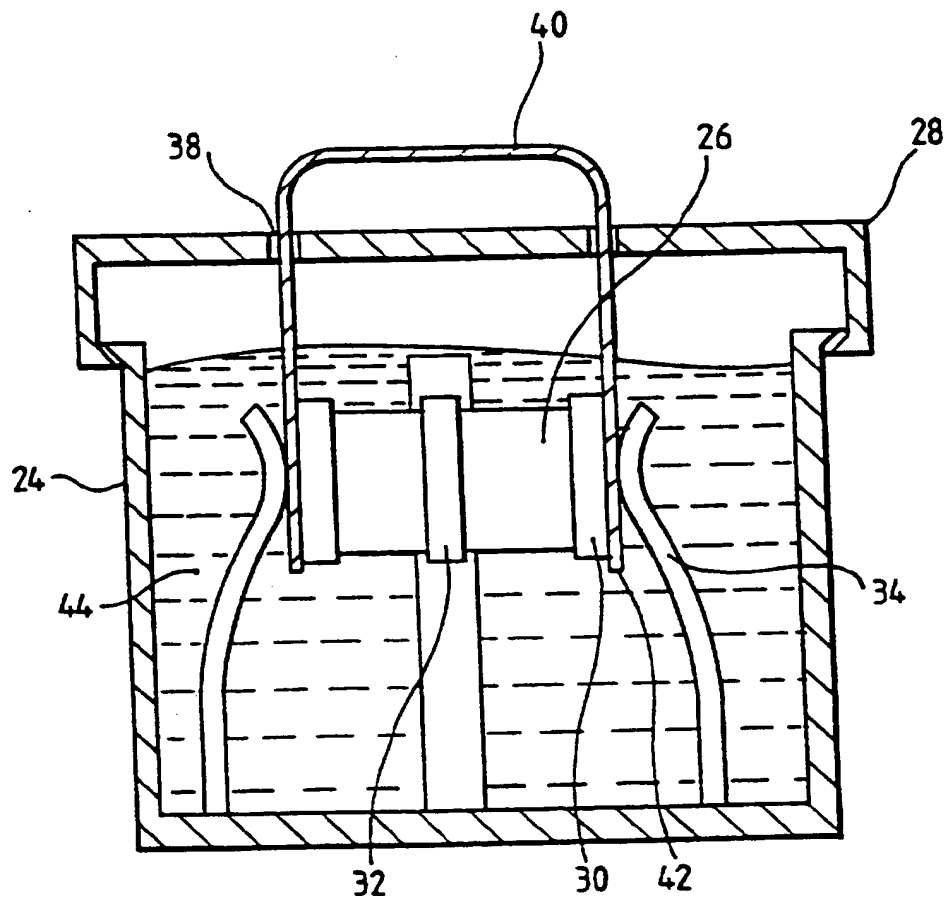


Fig.4.

TELECOMMUNICATIONS APPARATUS

The present invention relates to apparatus for use in telecommunications systems.

In a telecommunications system, it is necessary to provide a connection between the exchange wire and individual subscriber wires. This is normally done at a distribution point, which is frequently positioned at the top of a telephone pole. The exchange wire will generally lead from the telephone exchange to the distribution point and is therefore prone to lightening strikes and similar electrical discharges which cause high voltage surges to propagate along the exchange wire. If such surges were allowed to reach the subscribers apparatus, significant damage could be caused thereto. Where such discharges are reasonable likely, therefore, it is normal to include surge protectors in the distribution point, which serve to ground the consumer wires in the event of an overvoltage being present on the exchange wires.

After installation of a consumer wire or wires, it is of course necessary to test the installation to ensure that it is working correctly. In order to do so, it is normal to send a predetermined signal along the exchange wire. That signal must be significantly larger than that expected in normal operation in order to detect any incipient short circuits or inadequate sealing or insulation along the newly installed line. Unfortunately, the size of the signal is usually sufficient to trigger the

surge protector and cause a false fail.

Hitherto, the surge protector has therefore been removed from the installation in order to allow testing. Surge protectors are small items, usually not much greater than 1 cm in length, and if removed in large quantities at the top of a telegraph pole are apt to be lost. Installation engineers are also liable to forget to replace them. This means that the cable can be left unprotected.

The applicants have previously proposed the inclusion of isolators consisting of an elongate strip of polymeric insulation material which sat between the electrical contacts and around the surge protector. However, installation engineers then failed to notice the isolator and left it in place, again leaving the line unprotected.

Removal of the surge protector, or removal of an isolator immediately adjacent the surge protector is also generally felt to be unsatisfactory. It inevitably entails disturbing the protective covers and sealant around the surge protector and its contacts. Since the sealant is often a grease or gel material, this is also messy and inconvenient to replace. In an adverse climate, such disturbance could be detrimental to the life expectancy of the unit, causing the exchange wire to be left unprotected during the latter part of the expected life of the system.

The present invention therefore provides a surge protection apparatus for a telecommunications circuit comprising a surge protector and a pair of electrical contacts adapted to connect the surge protector to the telecommunications circuit, the apparatus including an external closure enclosing the surge protector and the contacts thereto, wherein an isolator is provided in the form of a piece of insulating material placed between the contacts having a gripping portion extending to a region outside the closure thereby to aid identification and removal of the isolator.

Preferably, the isolator is in the form of an elongate strip of insulating material formed into a U shape, the ends thereof projecting between the contacts and the middle thereof being situated outside the closure and providing the gripping portion.

It is also preferred if the isolator projects through apertures formed in the closure.

It is further preferred if the closure and the isolator are formed in contrasting colours, so that it is clear to an operator that the isolator is still present. Preferably, the isolator is a brighter colour than the closure, therefore tending to draw the eye towards the isolator.

An embodiment of the present invention will now be given by way of example, with reference to the accompanying figures, in which;

Figure 1 is a perspective view of a ten pair terminal unit suitable for use in a distribution point, showing nine isolators in place and one removed;

Figure 2 shows in more detail a single isolator and surge protector with the isolator removed;

Figure 3 is a view similar to that of Figure 2, with the isolator in place; and

Figure 4 is a cross-sectional view through a part of the terminal unit of Figures 1 to 3.

Referring to Figure 1, this shows a pole top distribution point 10 in the form of a ten-pair terminal unit. For clarity, the external cover of the terminal unit has been removed. An incoming exchange wire 12 passes

through an aperture 14 in a wall of the unit 10 and is held by a cord grip 16 before being divided to lead to one of ten terminal points 18 arranged in two side-by-side rows of five. These terminal points 18 comprise a pair of bores 20 facing outwardly thereof and a bolt head 22 on a top surface thereof, rotation of which causes the terminal unit 18 to raise and lower itself relative to a pair of IDC connectors (not visible). As the terminal unit 18 is lowered, a consumer wire placed in a bore 20 is inserted into the IDC unit. A fuller description of the terminal block can be found in our earlier Patent Applications GB-A-2129630 and GB-A-2176062.

Each terminal unit 18 has a barrel-shaped compartment 24 in which is situated a surge protector 26. This is visible more clearly in Figure 2 in which the lid 28 of one compartment 24 has been removed to reveal the surge protector 26. This has three contacts, being a disc-shaped contact 30 at either end thereof and a ring-shaped contact 32 about the middle of the cylindrical protector 26. The end contacts 30 are connected to the incoming exchange wires via sprung contacts 34 and the central contact 32 is connected to earth via earth clip 36. This arrangement is described in more detail in our Application No. GB-A-2176062 mentioned above.

Referring back to Figure 1, each cap 28 is formed with a pair of apertures 38. These are visible on the compartment 24 of Figure 1 from which an isolator has been removed.

The isolator 40 comprises a substantially U-shaped elongate strip of plastics insulator material, the spacing between the legs being approximately equal to the spacing between the apertures 38 on the cap 28. The isolator can therefore be inserted through the cap with its legs passing through the apertures 38, and will occupy the position shown in Figure 3. In Figure 3, the cap 28 has been omitted for clarity, but it should be understood that an important feature of the invention is that the isolator 40 extends from outside the compartment 24 to inside.

Thus, the ends 42 of the legs of the isolator 40 lie between the disc contacts 30 of the surge protector 26 and the contacts 34 connecting same to the telephone lines, as shown in Figure 3. Thus, the surge protector 26 is disconnected.

The terminal unit 10 can be supplied in the forms as substantially shown in Figure 1, i.e. with isolators 40 present on each terminal 18 ensuring that all surge protectors 26 are isolated. It can then be installed and tested. Once testing is complete and successful, the isolators 40 are clearly visible and obvious and can be removed by an engineer.

The usual colour for terminal units is black, and therefore a preferred colour for the isolators 40 is yellow or a similarly bright and obvious colour.

As shown in Figure 4, the interior of the compartment 24 is normally filled with a grease or gel based sealant material 44. Once the isolator 40 is removed, the contacts 34 will move to make electrical contact with the disc contacts of the surge protector 26, and the entire arrangement will remain under cover of the sealant 44. It will not be necessary for the engineer to interfere with the sealant, and no path will be available for moisture to reach any contact. Meanwhile, the presence of the isolator is immediately obvious and apparent to the engineer.

It will be apparent to those skilled in the art that the above-described embodiment has been given by way of example only, and that many variations can be made thereto without departing from the scope of the present invention.

CLAIMS

1. A surge protection apparatus for a telecommunications circuit comprising a surge protector and a pair of electrical contacts adapted to connect the surge protector to the telecommunications circuit, the apparatus including an external closure enclosing the surge protector and the contacts thereto, wherein an isolator is provided in the form of a piece of insulating material placed between the contacts having a gripping portion extending to a region outside the closure thereby to aid identification and removal of the isolator.
2. Apparatus according to claim 1 wherein the isolator is in the form of an elongate strip of insulating material formed into a U shape, the ends thereof projecting between the contacts and the middle thereof being situated outside the closure and providing the gripping portion.
3. Apparatus according to claim 1 or claim 2 wherein the isolator projects through apertures formed in the closure.
4. Apparatus according to any preceding claim wherein the closure and the isolator are formed in contrasting colours.
5. Apparatus according to claim 4 wherein the isolator is a brighter colour than the closure.



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Claims searched: 1 to 5

Examiner: M J Billing
Date of search: 8 August 1997

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): H2H HAPB, HAPC.

Int Cl (Ed.6): H01C 7/12; H01H 27/04; H01T 4/00, 4/02, 4/04, 4/06; H02H 9/04, 9/06;

H04M 3/18, 3/22, 3/26, 3/30, 3/32; H04Q 1/14, 1/20, 1/22.

Other: ONLINE : WPI.

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	GB1276801 (RELIABLE) - Figs.5,8; page 5 line 100 to page 7 line 33	1
A	EP0095539A1 (RELIANCE) - page 9 lines 20-34	1
A	US5086368 (KRONE) - Figs.2,3; column 3 lines 20-38	1
A	US4426121 (KRONE) - Fig.1; Abstract	1

X Document indicating lack of novelty or inventive step
Y Document indicating lack of inventive step if combined with one or more other documents of same category.
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P Document published on or after the declared priority date but before the filing date of this invention.
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